The Journal OF THE South Carolina Medical Association

VOL. XVII. GREENVILLE, S. C., OCTOBER, 1921 NO. 10

Medical College of S. C.

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Published Every Month Under the Direction of the Board of Councilors.

Entered as second-class matter February 9, 1916, at the post office at Greenville, South Carolina, under the Act of March 3, 1879.
Acceptance for mailing at special rate of postage provided for in Sec. 1103 Act of October 3, 1917, authorized August 2, 1918.

Annual Subscription, $3.00. EDGAR A. HINES, M. D., Editor-in-Chief, Seneca, S. C.

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EDITORIAL

CANCER WEEK CAMPAIGN

The announcement of the plans and organization of the National Cancer Week has been sent out to the various chairmen of the local committees. The campaign will be nation-wide and begins October 30th and extends to and including November 5th. This campaign is being put on by the American Society for the Control of Cancer. The aim is to reach as many people as possible and acquaint them with the fact that cancer is not necessarily fatal if recognized and attended to early enough. In order to reach the laymen, newspaper publicity, lectures or brief talks before nurses, women's clubs, fraternal orders, civic clubs, in the churches, before department store employees, ladies' aid societies, gatherings of school teachers, etc., will be employed. Dr. R. S. Cathcart, Charleston, Professor of Surgery at the Medical College of the State of South Carolina, is the State Chairman, and has already shown a very active interest in the campaign. We take this occasion to urge

the most cordial co-operation on the part of the profession of South Carolina with Dr. Cathcart in this great and beneficial undertaking.

GREENVILLE COUNTY MEDICAL SOCIETY HOLDS A SPLENDID MEETING.

The Greenville County Medical Society held one of the most successful meetings of the year on Monday night, October 3rd, at the Ottaray Hotel. Two specially invited guests, Dr. James A. Hayne, State Health Officer, and Dr. J. J. Watson of Columbia, presented papers of unusual interest; the former on the subject of Pellagra and the latter on the Diagnosis of Abdominal Conditions. After these well-known speakers had presented their papers, a general discussion was entered into. Not the least attractive feature of this meeting was the banquet at which were seated about seventy-five members of the Greenville county profession. We understand that it is the custom of this society to hold a real get-together meeting once every three months in addition to the regular monthly meetings the first Monday night of each month. We understand that this plan is meeting with marked success.

SOUTHERN MEDICAL ASSOCIATION MEETS AT HOT SPRINGS, ARKANSAS.

The members of the profession in South Carolina are always keenly interested in the meetings of the Southern Medical Association. This year this splendid organization meets at Hot Springs, Arkansas, November 14-17. Reduced rates have been secured on all railroads on the certificate plan. The officers of the Association confidently anticipate the coming meeting to be the most successful of any hitherto held. An attendance of two thousand is expected. Dr. J. L. Crook of Jackson, Tennessee, is President, and Dr. Seale Harris, Birmingham, Alabama, is Secretary. We urge all members who intend to go to get in touch with the special train under the auspices of the Secretary of the Georgia Medical Association, Dr. Allen H. Bunce, Healey Building, Atlanta, Georgia. The train is scheduled to leave Atlanta at 5:30 p. m., Saturday, November 12th. Reservation should be made through Mr. Pat B. Hampton, District Passenger Agent, S. A. L. Railway, Atlanta, Ga., or Dr. Allen H. Bunce, Secretary Georgia Medical Association.

ORIGINAL ARTICLES

SYMPTOMS AND TREATMENT OF EYESTRAIN

(By Wm. B. McWhorter, B. S., M. D., Anderson, S. C.)

Definition.—Eyestrain is a state of fatigue of the ocular muscles producing local and at times constitutional symptoms.

The muscles concerned are the ciliary and the extrinsic muscles of the eyeball. They are primarily and the other eye structures secondarily involved.

In order to get a clear conception of the subject it is necessary to understand fully **what eyestrain is and what it is not.**

It is not the mere existence of refractive error. This may exist and yet if there is no effort made to overcome it and get clear vision strain will not result.

It is not strain resulting from an effort to improve poor vision due to some pathological condition within or without the eyeball. Such impairment of vision can not be improved by extra eye effort and strain consequently does not result.

2. Forms.—Three form of eyestrain are usually recognized:

(a) Accommodative.

(b) Muscular.

(c) Nervous and reflex.

By accommodative strain is meant that which results from the effort to overcome some refractive error and get clear vision. This is the most common form of eyestrain. The mere existence of error is not sufficient, however. The element of fatigue must be present. The occurrence of fatigue depends on other factors such as the degree of error, the kind of work, length of time eyes are used, kind of light and state of the general health.

The refractive error may be hyperopia, astigmatism, myopia, or any combination of these.

It is easy to see how ciliary muscle strain occurs in hyperopia. In the emmetrophic or normal eye rays of light coming from a distance of twenty feet or more focus on the retina with the ciliary muscle relaxed. Vision is clear without accommodation. In the hyperopic eye, however, rays of light coming from a distance of twenty feet or more do not focus on the retina but behind it. To get clear vision the eye must **continually** accommodate. To get clear vision it must accommodate **more** than the normal eye. The ciliary muscle gets no rest. It becomes fatigued and strain results.

The other forms of refractive error may also produce strain by interfering with normal accommodation.

(b) By muscular strain is meant that which results from lack of balance between the external ocular muscles. We have two eyes and would see double if it were not for the function of the external ocular muscles. They so co-ordinate the movements of the eyeballs that the images of the object looked at fall on corresponding parts of the retina. The images are fused and we see only one object. Where one set of muscles are weaker than their opponents they become fatigued in trying to maintain this co-ordination. Strain consequently results.

(c) Before speaking of the nervous and reflex causes of eyestrain, I wish to call attention to the intimate relation existing between the eyes and the rest

Read by title before the South Carolina Medical Association, April 20, 1921, Columbia, S. C.

of the body. The eyes are not two glass marbles placed in the head possessing only optical properties. They are a part of the general economy. The eyes react to troubles situated in distant parts and distant organs react to troubles in the eyes. Syphilis, nephritis, diabetes, arterio-sclerosis and many other constitutional conditions produce characteristic changes within and without the eyeball.

Vision consumes much nervous energy. This is especially true in our modern civilization. School life makes heavy demands on the eyes. After working the eyes all day we attend picture shows at night or read by artificial light. Much nervous energy is consumed with vision and it consequently follows that any constitutional condition which lowers the tone of the nervous system decreases visual efficiency. This is seen during illness, convalescence, or due to worry or overwork. The eyes are more easily fatigued and strain more readily results.

It is hard to draw the line between an eyestrain that is of nervous and one that is of reflex origin. The term **reflex**, however, is usually applied to those conditions of strain or irritation in the eyes which result from pathological changes in the nose, sinuses, teeth, etc. The eyes, nose, sinuses, teeth are all supplied with sensory branches of the same nerve, the fifth cranial. Irritation of any of these peripheral nerve endings will affect the eyes. By suffing pepper up the nose you can prove this. The eyes will congest and weep tears of protest. In like manner do accute and chronic pathological conditions in the nose, sinuses, and teeth irritate the eyes and make them more subject to strain.

(3) Symptoms.—The eyestrain patient may have local or constitutional symptoms or both.

Local symptoms occur in the eyes and usually consist of:

(a) Simple fatigue.
(b) Pain in eyes.
(c) Headache.
(d) Congestion.

(t) In simple fatigue the ciliary muscle or external ocular muscles become exhausted and relax. There is blurring of near vision. The patient complains of letters and words running together.

(b) Pain may occur in the eyes on forcing them to do near work. This isdue to fatigue or spasm of ciliary muscle.

(c) Headache is one of the most common symptoms. It is most commonly a frontal headache and is more likely to come on after prolonged use of the eyes. It may, however, occur in any part of the head and appear to have no direct association with use of the eyes. Eyestrain is one of the most common causes of headache. It may be the entire cause of a headache or it may be only one of the factors responsible.

(d) The demand for extra work in eyestrain calls for more blood to the parts. The conjunctiva may be injected. The eyes may burn and water and be sensitive to light. There is a predisposition to conjunctivitis, blepharitis, styes; chalazia, corneal ulcers, etc.

(b) Constitutional Symptoms.—We have already spoken of th eway in which lowered states of the nervous system affect the eyes. It works both ways. Continued eyestrain causes a waste of nervous energy which may lead to functional disorders in distant organs. The more unstable the nervous system the more likely are these functional disorders to occur.

It should not be forgotten that the credit for first calling the attention of the profession to the importance of eyestrain in functional nervous disorders belongs to Gould, who brought out his Biographic Clinics in 1903.

We wish to be conservative. At the same time we believe that many reflex nervous disorders are due to severe and

unrecognized eyestrain. We have seen such disorders disappear when the eyestrain was relieved. We do not believe the medical profession as a whole attaches sufficient importance to eyestrain as a cause of reflex nervous disorders.

(4) Treatment.—The treatment of eyestrain consists in finding its cause and removing it.

If it is due to some form of refractive error, then the kind and amount of error should be carefully determined and corrected by the proper lenses.

Refraction is very important work and to be well done requires knowledge of the anatomy, physiology and pathology of the eye. It also requires much time and painstaking work.

The motive behind refraction should be to determine the exact refractive error that exists, if any, and whether or not it is producing eyestrain. The motive should not be to sell a pair of glasses whether the patient needs them or not. The oculist should prescribe the lenses needed just as the physician prescribes a certain drug for a given condition. It should be the optician's business to fill this prescription.

If the eyestrain is due to imbalance of the external ocular muscles, then this condition must be relieved by correcting the underlying refractive error, by the use of prisms or by operation on the muscles themselves.

If the eyestrain is of nervous origin, due to a weakened condition of the system from any cause, then it must be relieved by rest of the eyes and by giving the treatment necessary to restore the general health.

If the strain is of reflex origin, then the offending focus must be removed. Clean out and drain infected sinuses, remove nasal obstruction, eradicate focal infection in teeth and tonsils.

Finally, gentlemen, the eyestrain patient may have a refractive error; he may have a muscular anomaly; he may have some pathological condition in the nose, sinuses, mouth or throat; or he may have some constitutional condition affecting the eyes reflexly. We must conclude, therefore, that eyestrain is a medical problem.

Dr. Hiram Woods, professor of diseases of the eye at the University of Maryland, says, "The medical profession both general and special should teach the public that eyestrain is a medical problem and that the so-called optometrist with no medical education is not the man to trust with the differentiation between healthy and diseased eyes."

I thank you.

THE NECESSITIES FOR PROGRESS In THE TEACHING OF THE FUNDAMENTAL SCIENCES OF MEDICINE.

(By Kenneth M. Lynch, M. D., Charleston, S. C.

Progress and development are modern terms which are included in the mottoes of all people whose habit it is to look forward and not backward. There is no such thing as a permanent standstill; unless there is progress, there is retrogression. In progressive development we are likely to make mistakes and to discard and destroy the beautiful and useful, but usually such unfortunate events are the result of indifference or passive interest and not because of active interest by those concerned. Active concern by those responsible for the conditions governing any interest is calculated to aid in bringing about an orderly and progressive beneficial evolution. That the order of things in progressive development cannot be interfered with and that all things happen for the best, is not in the minds of thinking people of

Read before the South Carolina Medical Association, April 20, 1921, Columbia, S. C.

the present day. It therefore behooves those of any calling to actively bestir themselves to fulfill an obligation to creation which is just as binding as that to live a productive and honorable life.

Unfortunately, immersion in educational life and scientific interest has tended to make scientists and teachers reticent and not outspoken about their needs and those of their work. Association with the obscure and search after the unknown tends toward dissociation from the commonplace, the practical, and the often sordid, of everyday life, and instead of producing aggressive demanding personalities rather leads to acquiescence to things as they are and are made by some less responsible body but with more authority.

And so the teachers of the sciences concerned in medicine, which furnish the topic under present consideration, have been accustomed to accept the dictum of those who have the material authority over them as the cross which it is the lot of the life to bear, and to go about their business as best they might, often under handicaps which seem insurmountable, rather than make a determined stand for what they know to be essential.

Whether or not this is an unalterable condition I do not know, but the awakening of teachers of the medical sciences to the realization that it should be altered is one of the outstanding features of the day in medical education.

In reading the report of the proceedings of the Association of American Colleges for 1920, a book of 175 pages devoted to the needs of medical education, one cannot fail to be struck by the fact that it analyses into a petition for bettering the needs and conditions of medical teachers in order to prevent the development of conditions incompatible with progress and inimical to sound educational leadership, if not a catastrophe.

In order to illustrate the trend of thought and the apprehension in the collective minds of the leaders in medicine and the medical educators of the country, it is only necessary to quote from the reports of the committees on the various parts of the medical curriculum.

Illustrative of the training and qualifications which a teacher must attain, and of the necessities obtaining, we read in the discussion of the department of anatomy:

"The man in charge of gross human anatomy should have ability as an executive and as an investigator. He should have had a good training in and be in active touch with anatomy and the cognate sciences, especially with clinical physiology. He should have ability to arouse in his students pleasure in working to understand the human mechanism. He should arrange their work so that they may get training not only in the technic of dissecting but also in the art of expressing the results of observation; not only in the use of anatomical comprehension; not only in following directions, but, above all, in resource and initiative."

"For the professor of gross human anatomy we, therefore, demand a man of unusual natural ability and unusual experience and training. Such a man certainly deserves as much in the way of financial reward as the full time clinical teacher. For a man meeting all of the requirement in an unusual way, an annual salary of $10,000 is none too large. Yet we find the highest salary paid today is about $6,000, and the average salary is about $4,000. The replies which the committee has receivd show a surprisingly good general standard of fitness on the part of our teachers of anatomy in spite of inadequate compensation. There is evidence, however, that compensation for teachers of anatomy as for teachers of other fields must be increased if the supply

of qualified teachers is to be maintained."

Again in the report on physiology:

"What, then, should be the physiologist? Surely not any doctor, as in the old days, who was willing to teach, but who failed to get one of the 'better chairs.' Surely not some young M. D. who has gone through the regular curriculum and is willing, for a while, to forego the emoluments of practice?"

"To master the science one must live in it for several years, in a laboratory presided over by a productive and stimulating physiologist." "Give him (the professor of physiology) freedom and security of tenure. Give him an adequate salary. Supply a well trained staff. Do not forget that his leading subordinates should be strong men and should have good salaries, not a third or half but 75 or 90 per cent that of the chief. Supply such salaries not only because they are deserved, but because from this group of assistants must come the future leaders. We must have a school of physiology and some future for its students, or they will leave the science, as they are now doing."

"Prof C. M. Jackson says anatomists are extinct, like the dodo. The race of laboratory teachers seems on the way to extinction. The few now in captivity are the only known specimens. One imagines a few years hence that museums will point with pride to a well preserved jaw bone of an anatomist, or the gall-bladder of a physiologist still filled with bitterness, or a pharmacologist's egg." Which is only an illustration of truth spoken in jest.

While one does encounter evidence of optimism in the outlook, the main expression is decidedly pessimistic.

"At the present time," says Burton Opitz, "physiology is in such a lamentable condition that it would be almost criminal on the part of any instructor to lead a student of medicine into physiologic research." Professor Bachman says, "Only those having unlimited faith and an inexhaustible capacity for renewal of disappointed hopes may become candidates for teachers of physiology." Professor Reichert says, "It is questionable if any one should be encouraged to take up teaching as a profession under present conditions of emolument."

"These are extreme views, but the opinion is common that the financial outlook must be improved before one can expect gifted young men to select physiology as a career."

In the questionaire sent out to teachers of physiology over the country, in regard to the preparation of teachers, "everybody mentions better demuneration as the first necessity."

In the report of the committee on the teaching of bio-chemistry, one encounters as the main problem, the supply of teachers. It says, "Given adequate time, space, equipment and teachers and the problem virtually disappears. Medical schools and the A. M. A. have been making commendable efforts to supply everything—except teachers.

Again in the report on pathology:

"Unquestionably, the necessity of larger salaries for heads of departments, and especially for young men entering the laboratory, causes the greatest anxiety to most pathologists for the future of their calling. It is stated that only unmarried men, or those without families, or those with independent means should enter pathology, for the time and energy required to become a competent pathologist are greater than in any other branch of medicine, and the financial reward is for less than for a similar degree of specialized knowledge in other fields." "It is not the young man who makes the sacrifice." "But when he is indiscreet enough to marry and have a family, it is his wife and children who suffer. With this dilemma in mind, no middle-aged pathologist can seriously urge a young man

to enter pathology under the conditions generally existing in America. To the claim that medical institutions do not possess su--cient funds, a single incident may reply. Recently a commission of practitioners recommended the expenditure of $10,000,000 for the care of the insane in the State of New York, concluding their report by bemoaning the paucity of research. But the highest salary they provided for a pathologist was $3,500. "The future of pathology in America is now seriously jeopardized by the movement to secure full-time clinical teachers and pay them larger salaries than are paid the teachers of the medical sciences. If one can obtain the same opportunities for research and the same academic conditions in the branches of clinical medicine, any young man who will fit himself for anything except the clinical branches must have something wrong in his make-up.

"Your committee wishes firmly to state its belief that unless it is intelligently controlled, this movement, which is peculiar t othe United States, will become a grave menace to the progress of medical science."

Dr. L. B. Wilson in discussing these reports has to say:

"It does seem to me that some of the departments are so well under water that they are almost lifeless, and I believe the fundamentals in medicine should have their noses above water. Do not let us drag down the other fellow, but let us do a little kicking ourselves and try to get out." You cannot expect to get a director for $3,500 a year to twice that amount for a pathological institute like Blockley, a man who has had five years experience in pathology, who must be an executive, who must be an investigator. "It is all nonsense to offer such a man $3,500 a year." "At the other end of the great state of Pennsylvania they are paying coal miners that much for digging coal."

In the expressions of the leaders of laboratory medicine which fill this booklet, one finds authority for the statement of a problem which involves the very roots of medicine, and which must cause decay unless remedied. The disease has passed the premonitory stage and is now in full course. Chairs are vacant in many of our schools and cannot be filled. Those who are young enough to get out and find an opportunity are taking it. Those who are rooted and passed the time for change will remain as long as they are useful. Recruits are hardly to be had. Already the pillars of the profession are being repaired out of poor material, men who know they cannot make a success of the practice of medicine or those who have already failed to do so.

So long as medical teachers talk of these things only among themselves, conditions will not be bettered. It is for them to place the question before the general profession. The practicing profession must pass upon the matter. They alone can command that progress shall be made. Hence the purpose of this paper of quotations: to lay the problem before the profession of this state, not in the form of an individual opinion, but as a summary from the teaching profession.

Discussion of Dr. Lynch's Paper.

Dr. Joseph H. Cannon, Charleston. I think this subject is so important that this Association should take some notice of it, if nothing more than to appoint a committee to see what should be done. I have no motion, but I think some notice should be taken of it.

Dr. F. A. Coward: I think that none of us really have any very definite plan in view, and unless we have there is no occasion for discussion. Certainly no one could take issue with what the doctor says. The longer a man is out the more he sees the necessity of study and realizes his own

lack, not only that he did not take advantage of his opportunities while in college, but his inability through press of work and lack of funds to supply the need he feels of education. How much students all of us would be—that thought comes to me again and again—if we could go back and do our work over again.

I think Dr. Hines would be better qualified to speak of the school of postgraduate study in our Medical Society. Such things as Cabot's clinics have been carried out with great success. But I hope Dr. Lynch and Dr. Phillips will have more to say.

Dr. E. A. Hines: I feel that the Association would be glad to hear from our distinguished visitor, Dr. Hall, the Secretary of the Tri-State Society, and who comes from one of the centers of medical education at Richmond. I believe you would rather hear from such men as Dr. Hall and Dr. Townsend of North Carolina than from me.

Dr. James K. Hall, Richmond, Va.: We are confronted in the State of Virginia at present with an effort to improve the education of the medical student. The problem confronting the State at this moment is the possible bringing together into one school of the two existing medical schools in the State in order that the education of the medical student may be carried on better. Of course all of us who have been in any kind of practice for several years, or even for a few years, realize with increasing keenness, and I may say also with interesting embarrassment, the need of constant re-education. I read an article in some medical journal as I came down here n which I saw the statement—astonishing to me—that more progress had been made in medicine within the last fifty years than had been made prior to that time in the history of mankind. If that statement be true we must realize how impossible it has been for any man who has lived his whole professional life during this fifty years—we must realize how impossible it has been for any one man to keep track of all the progress that has been made in that time.

I am glad to have heard these papers I feel more than repaid for my trip down here by these papers alone, not to speak of the many other good papers I have heard read, and I hope that some steps may be taken here that will make it possible for the general practitioner to keep more fully abreast with the advances being made in medicine. The lay people are waking up to the amount and kind of knowledge that the family physician ought to have and I believe that some of his lay pressure is driving us into better attendance upon the medical societies than we used to see. I think doctors attend medical societies very much more frequently than they used to do, I think their attention is more intent, they are interested more scientifically, and all these things are indications of the individual feeling for constant post-graduate work. I hope with the gentlemen who have spoken that some plan may be formulated here that will make it possible for any and every practitioner to pursue, either at home or away from home, some time during every year, a post-graduate course of study.

Dr. M. L. Townsend, Charlotte, N. C.: Certanly no subject can be much more pertinent than this question of the progress of medical education and post-graduate work. The subject of post-graduate work means a great deal in a great many different phases. There is one kind of post-graduate work where we go back to our Alma Mater and take a course; and then another kind, which is as important, and that is this meeting here today. There is still another kind of post-graduate work to which Dr. Hines has devoted himself, and that is the practical use of current medical literature. These things I th nk we cannot emphasize too much. It is perhaps regrettable that the rank and file of medical men do not use the advantages that they have on their own desks every day in studying and reading the literature and clearly stated articles which are appearing in the current medical literature. These things are possible and to me are very interesting and important.

I should like only to add my influence in any way I possibly can to encourage the practcal use of current medical literature. Certainly the trend of the times shows us clearly that doctors are more interested in these things than formerly. This is evidenced by the increased interest, attendance and membership in all medical societies. Your South Carolina Society is one and the other societies are the same. These thigs are certainly very encouraging.

Dr. W. A. Boyd, Columbia: I am particularly interested in some of the points brought out in the paper of Dr. Phillips. Although he stated in the beginning that he had an unfinished paper, personally it rather appeared to me that he had a very finished and polished paper touching almost all of the points of post-graduate study. There is no question that we men who get out from medical schools into general practice, lose touch with the progress that is going on in the line of medicine and surgery, because of our work and the inability to meet often enough with the large groups of men who are doing research work and advanced work along these lines. It appears to me that in the Medical College of the State of South Carolina, and in the professors there, we have men who should be writing, who should be called upon to go through the state to the various county medical societies from time to time, to present before the medical men in those societies some topic of interest from which all could learn. Again, it is impossible for all of us from time to time to leave our work to visit the large clinics of the North and elsewhere in the country for post-graduate work, but we have right here today in the State of South Carolina and in the cities of this state men who are doing work that compares favorably with the work being done by men anywhere in this country. I can see no reason why we could not start right here in our own state, in Charleston, Columbia, Spartanburg, Greenville, Florence, Chesterfield and other towns where there are hospital facilities, certain clinic days—two days of the year, where men from the surrounding towns can come and see the work being done along important medical and surgical lines. That was done a year ago in Columbia and I am quite sure the gentlemen who came here were benefited. We men of Columbia were certainly benefited, because it gave us an opportunity to look back on our own work and see what we had accomplished. That, I believe, is the great field of post-graduate study in the state of South Carolina today.

Dr. A. B. Patterson, Barnwell: The attitude of the public mind toward the medical profession concerns me more than anything else. The public will never have anything more than they want. They are not judges of the doctor; they are not judges of the qualifications of the family physician. There is no way by which they can get at the attainment of the doctor. They do not know whether the doctor that is treating their child is treating it right or wrong; they do not know whether the medicine he is giving is the right medicine; they are not judges and in these matters do not pretend to be. I think it is a fact that the first thing a young man learns when he comes out of college is that his success does not depend upon his qualifications but upon his personality. Then he goes to work to make himself popular and agreeable with the masses and that is the way he makes his start. What is there to encourage doctors spending their hard-earned money in taking post-graduate courses? The thing to do is to educate the public mind on these matters. How is it to be done? When I have raised my voice in my home town on this matter men and women are quick with the suggestion that it was with a selfish motive. I have tried to educate them along this line; I have failed to do it. But unless something is done to educate the minds of the public I do not believ ethe doctors will spend their money for post-graduate training.

Dr. W. F. R. Phillips, Charleston. I do not believe that any of us have the idea that the problems set forth in these papers are to be solved at the moment. If they are solved within a generation it will be about as hopeful an outlook as we may expect. We will not solve any problems, however, until we recognize that we have problems to solve. The fundamental principle in attacking anything is first, the recognition of the problem. We have two classes of problems, those presented by Dr. Lynch, involving the medical educator as such; and those I have tried to outline, respecting the enabling of the graduate to keep up with the progress of medicine. We cannot expect the graduate to do more than to equal his instructor, so to speak. It is sufficient that the servant be as good as his master. And we are not going to have well educated medical students in the future unless we keep in our schools as good men as there are to be found in the medical profession anywhere. The most serious immediate problem that we face today is presented in the fact that the good men in the fundamental branches of medicine are being taken out of the medical schools and only those who cannot make a living anywhere else are being left there

to lay the foundation upon which the future superstructure of medicine is to rest. That is the plain truth of the matter. The younger men, the good men, are being offered inducements elsewhere in medical work and practice that no one could expect them to refuse. The older men (among whom I count myself) do not have the opportunities offered to the younger men, but the men who are to take their places will be second-grade men unless the profession, as a whole, wakes up and sees that something is done to make these fundamental positions just as attractive to capable men as they can be made. That, gentlemen, is the immediate problem that confronts us in one of our ways of advance.

The other problem, of how you and I are going to keep in reasonable touch with the broad field of medical science, is more difficult to solve probably than the first. The first can be solved by money; but the other can only be solved by doing what Sir Isaac Newton did before he could expound the law of gravitation—by thinking about it, and we may add, by talking about it.

TOXIN-ANTITOXIN IMMUNIZATION

(By F. A. Coward, M. D., Columbia, S. C.)

Toxin-Antitoxin:

By toxin-antitoxin immunization we mean the production of active lasting immunity by the inoculation of toxin—thus stimulating the auto formation of antitoxin by the cells of the recipient animal. This in distinction from the passive and temporary immunity produced by the direct inoculation of performed antitoxin only; the latter exciting no cell activity except that leading to the speedy elimination of the foreign antitoxin with the resultant termination of its neutralizing action—unless this be sooner terminated by combination with toxin, in the tissues, but not yet bound to tissue cells. So far most of the work done in the practical application of the principle has been with the use of diphtheria toxin, the preparation for injection being a neutral or nearly neutral combination of diphtheria toxin with its specific antitoxin. The injection of toxin alone requires that beginning doses be extremely minute—and even with the greatest of care it cannot be considered as certainly free from danger. But it has been found that toxin neutralized by antitoxin may safely be given in relatively large doses with safety—and yet it sets in motion the cellular forces of antitoxin production. Whenever changes take place in the balanced mixture after preparation tend to render it progressively safer, as toxin in such a mixture disappears more rapidly than antitoxin.

Read before the Second District Medical Association, St. Matthews, S. C., July 20, 1921.

Schick Test:

No consideration of diphtheria immunity would be possible without a word on this well known and proved procedure. As a check on results by toxin-antitoxin immunization it gives us the Q. E. D. to our antidiphtheria vaccination, and that with a mathematical certainty which is nowhere else obtainable in artificial immunity work. For a negative Schick means that the subject has at least 1-30 unit of diphtheria antitoxin in every 1 c. c. of his tissue fluids, and a person with tissue fluids so fortified will not have clinical diphtheria even though his nasopharynx be crowded to "standing room only" with virulent diphtheria bacilli. By means of the Schick test we have learned the age groups which are most susceptible to diphtheria, as also those groups less and least so. We can demonstrate the loss of immunity within a few weeks following the injection of antitoxin, this immunity reaching its peak at the end of six to nine weeks, and remaining for three years at least and probably for life.

The Schick Test.

1. What is it? Pure, unheated, sterile, diphtheria toxin—diluted at once

with phenol, further diluted with salt solution immediately before using.

2. How is it used? Intracutaneous injection.

3. Can it produce anaphylaxis, serum sickness or general reaction? It comes from no animal and contains no serum. It can produce no anaphylactic reaction except in persons whose cells are sensitized to peptone, diphtheria bacillus protein, or certain beef proteins used in preparing culture media. Such reaction, if it occurs, is entirely local and not annoying. It merely causes difficulty in recognizing a positive test.

4. What is its application? To determine which contacts need antitoxin and which may safely be left without antitoxin. To determine successful immunization by toxin-antitoxin vaccine.

5. Who should have it? Nurses and attendants persons thrown together in numbers in armies, institutions, orphanages, schools, particularly those in the age group six months to five years; to be followed in appropriate cases by toxin-antitoxin immunization. It is not less valuable in general use, but less practicable.

6. What will it accomplish? Money saving by withholding useless immunizing antitoxin, avoidance of useless and possibly dangerous sensitizations, economy of space in isolation wards and rooms (immune children not needing isolation), selection of proper subjects for toxin-antitoxin immunization.

7. Will it help solve the carrier problem? No. Chronic carriers are practically all immune and give a negative Schick. Since we know that 90 per cent of all persistent carriers have ulcers, abnormal crypts, or other demonstrable lesions or abnormalities of the nasopharyxn, the remedy here lies in appropriate surgical or topical treatment of th enose and throat.

Toxin-Antitoxin Vaccine.

What is it? A mixture of pure diphtheria toxin, neutralized by admixture of its antitoxin to the extent of its being nontoxic, but yet capable to stimulating antitoxin produced by the tissue cells of the recipient.

How used? Subcutaneous injection of 1 c. c., one dose results in marked immunity, three doses at seven day intervals have given best results.

No reactions in infants, in young children very slight reactions, local reaction in 30 per cent of adults. Local and general reactions resemble those from typhoid vaccine, but are in all cases milder. The only serum proteins present are derived from the antitoxin in the mixture. Since this is usually only abut four units, the results are trifling as compared to even an immunizing dose of antitoxin. Referring to serious bad results in Georgia and Texas, Park, who is the leading authority on the subject, states this "Schicking has now been adopted by all biological plants, which makes such accidents impossible. We have tested under all conditions and find that a product which after suitable testing is found to be correct will never become dangerous. There may always be an excuse for a first accident, but there can be none for a second, and I do not think that any will ever occur. We have injected over 30,000 children without a single bad result." (a)

Application: The artificial production of active and lasting immunity of high degree. Persons so immunized need fear no contact with clinical cases or carriers.

Will it help solve the carrier problem? Directly, No. Indirectly, Yes, by reducing the number of cases, hence the possibility of carriers of contact origin only. The chronic carrier stage following clinical diphtheria automatically ceases to occur when cases cease to occur.

Accomplishment: An immediate and

(a) Personal communication, April 4, 1921. Wm. K. Park, M. D., New York City.

direct reduction in the morbidity of diphtheria, with a secondary reducing effect on the mortality—since some vaccinated persons will possibly have the disease in mild, non-fatal form. The chief benefit will be the reduction in morbidity, with all the benefits thereby resulting. This is an important point. There is at least one city in the U. S. A. which has every means for combating the diphtheria problem by tactics based on all that we know of the disease. Our own state, by free distribution of antitoxin, free in every sense of the word, has gone far indeed. New York's mortality for 1920 was 10 per cent. South Carolina's was 6.7 per cent. These must be considered as approaching the irreducible minimum for mortality. Yet New York in 1920 had 12,000 cases, and South Carolina 2,158. In South Carolina the number has shown a progressive increase during the past five years.

After much deliberation the State Health Officer has authorized the announcement that the Schick test and toxin-antitoxin vaccine will now be furnished to physicians for use in appropriate cases, upon the request of the persons to receive the test or vaccine, or upon the request of the parents or guardians of children.

A demonstration of the Schick test and reaction will be made at a time and place to be announced during this meeting.

OSSEOUS AND JOINT TUBERCULOSIS—A REVIEW

(By W. A. Boyd, M. D., Columbia, S. C.)

The immediate cause of Tuberculosis of the bones and joints is of course the tubercle bacillus; for a long time it was held, that only the bacillus of human Tuberculosis produce Tuberculosis in the human race, but since the original studies and investigations of Koch and others, we know that the bacillus of bovine Tuberculosis is directly responsible for many cases of Osseous and Joint Tuberculosis—the majority of the cases occurring in the young, the period in which milk is largely used as a food. The avenues of entrance of the infection are the respiratory and alimentary tracts—we can consider the inherited infection as a possibility, and a bare one at that. The relative importance of the two portals is still undetermined, but in children where surgical Tuberculosis—Tuberculosis of the Bones and Joints—is more common, the ingestion source is more probable, while in adults the respiratory portal is the important one, as shown by the large majority of pulmonary lesions. It is quite possible that the infection may also come from the tonsils, teeth, genito-urinary tract or from any definite focus of infection. The direct infection of bone and joints from without need scarcely be considered; the avenue carrying the infection being the blood and lymph streams.

The relative importance of the blood and lymph streams as media of distribution of the infection, has been the cause of no little investigation. Albee (1) states that fro mthe results of the investigations today four conclusions may be drown:

(1) Experimental tuberculous lesions are difficult of production.

(2) Trauma is a relatively slight factor.

(3) Joints are much more susceptible to tuberculous infection than bones.

(4) And the joints are infected through the medium of the blood stream.

A predisposition to Tuberculosis may be shown as the result of injury heredity, and such general causes as the acute infectious diseases, poor feeding, and lack of fresh air and sunshine, all of which lower the natural resisting powers of the individual. While all cases

Read before the South Carolina Medical Association, April 20, 1921, Columbia, S. C.

of Osseous and Joint Tuberculosis will give a history of trauma, before the first symptoms of the disease were noticed, it is quite unlikely that trauma plays such an important role. When it does, it is the result of the direct lowering of the resistance of the tissues traumatised, with a pouring out of lymph and blood, so that the organisms circulating in the blood and lymph streams are arrested; however, where we have a circumscribed blocked off area of Tuberculosis, that is quiescent, it is quite easily understood that as the result of a trauma, the barrier may be broken down or weakened, and the disease lighted up.

In this review, I shall not enter into a discussion of the pathology of Osseous and Joint Tuberculosis, but will mention the different types of pathologic osseous and joint lesions according to Fraser:

1. The Encysted Tuberculous Lesion —Where the process is circumscribed and shut off from the rest of the bone.

2. The Infiltrating Tuberculous Lesion—Which is acute, spreading rapidly, destroying the blood vessels by occlusion and thrombosis and with the formation of large sequestrae.

3. The Atrophic Tuberculous Lesion —With an atrophy and wasting of the bony lamellae.

4. The Hypertrophic Tuberculous Lesion—Characterized by a thickening of the bony lamellae—a rare condition, and like the atrophic type involving the metaphysical portion of a long bone.

The pathological varieties of tuberculous joints are based upon the appearance of the Synovial membrane:

1st. Acute Miliary Tuberculous Synovitis.

2nd. Chronic Tuberculous Synovitis.

3rd. Fungating or Granulating Tuberculous Synovitis.

4th. Fibrous Tuberculous Synovitis.

5th. Arborescent Tuberculous Synovitis.

6th. Caries Sicca.

The localizing of a bone lesion is dependent upon the blood supply—granting that the infection is hematogenous —so that we naturally look for the infection to take place either at the ends of the bone where the blood supply is particularly large, the anastomosis of the vessels many and the presence of the membranes of the joint—in disease of the shaft of a long bone the focus of infection is practically always at or close to the central point, where the nutrient artery branches, and enters the bone. What then, becomes of this tuberculous lesion? It either becomes localized and remains so, or else the process goes on with the formation of an abscess under the periosteum (sub-periosteal cold abscess), breaks through the periosteum into the soft tissues and points under the skin, either over the focus of disease, or influenced by gravity and following the fascial planes, points at a distance from the original focus (this abscess being formed of disintegrated bone and soft tissues and the exudate from the tuberculous granulations, and is sterile).

The diseased process may then continue its course with an involvement of the entire shaft, or extend through the epiphyseal cartilage, then through the articulating cartilage, into the joint, with a resulting arthritis.

Clinical Features.

The clinical features of Osseous and Joint Tuberculosis are divided into general and local ones, the joints presenting more local features, because of the many structures involved, and also because of the constant friction between the opposed surfaces.

The **general features** are the same in both Osseous and Joint Tuberculosis:

1. Dissemination of the disease, which is rare and when it does occur, involves the glands and subsequently terminates in a Tuberculous Meningitis.

2. Toxemia—With loss of weight,

strength and appetite, pallor, fever, and digestic disturbances, the result of absorption of the toxins.

3. Secondary infection—This being the result of a mixed infection, following a Sinus, or the mistake of opening an Ichor pocket with a subsequent infection—shown by sweats, diarrhoea, septic fever, emaciation and Amyloid disease.

Local Features:

A. Osseous Tuberculosis:

1. Thickening of the bone, the result of new bone formation under the periosteum, which goes on slowly and steadily so that the bone frequently becomes twice its normal size. At first it can be dented in, but, as the process continues, the new bone becomes hard and unyielding. This thickening is generally confined to the diseased portion, but it might involve the entire bone. Tenderness is present, but there is no elevation of the local temperature, and no reddening of the skin.

2. Pain, due to pressure upon the nerve filaments, is not severe and frequently absent. When severe, it is due to sub-periosteal effusion, irritation of the nerve trunk from an Ichor pocket or granulation tissues, or to increased intraosseous tension (Tuberculous Osteomyelitis).

3. Muscular Atrophy—The result of disuse and the effect of the toxins (reflex irritation).

4. Abscess formation (Ichor Pocket)—As the result of pressure, the periosteum gives away and we have an abscess presenting, either over the original area, or at some distant point, being influenced by gravity, muscular action and the facial planes.

"Rivers" (2) states, "that in cases ofOsseous and Joint Tuberculosis, red and reddish hair is nearly twice as frequent, as in the ordinary population, and in the red haired, the spine was rarely attacked.

Symptoms and Signs of Joint Tuberculosis:

1. Stiffness—Most noticeable in the morning, and decreasing during the day, as the result of use of the joint and the stimulation of secretions in the joint, to a lessening of the synovial fluid, infiltration of the tissues or muscle spasm.

2. Limitation of motion, due to an early muscular irritability and spasm—in the upper extremities, the finer movements are first involved, while in the lower extremities, this limitation is marked by a limp.

3. Alteration in position of the joint—In the early stage, this is nature's effort to diminish the joint tension and to separate the joint surfaces, later, due to unequal muscle pull, distention of the joint with fluid, or actual bone destruction.

4. Pain—The result of increased tension, pressure from the thickened membrane, or to the exposure of th ebony surfaces following the destruction of the articulating cartilages. The pain varies, it is either localized or referred and is increased by moving the joint.

5. Night Cries—These are due to the ulceration of the articular cartilage, which during the waking hours, are kept apart by muscle spasm. During sleep the muscles relax and the ulcerated surfaces come in contact, resulting in restlessness of the child, or the child awakens with a cry. Just so soon as the child awakens, the muscles immediately go into spas magain, the joint surfaces are pulled apart, and the pain disappears.

6. Tenderness and Elevation of Surface Temperature—Tenderness is not always present, and is due to increased tension, pressure upon a disorganized portion, or to irritation of some structure around the joint. The increased local temperature is due to a hyperemia, the result of the joint changes.

7. Muscular Rigidity and Muscular

Spasm—Both the result of nature's effort to protect the diseased joint. The amount of rigidity varies, in some cases appearing only when the joint motions are carried almost to the limit, while in other cases the joint is fixed.

Abnormal muscular contraction may be toxic, reflex, and constant, called muscular rigidity, or it may be voluntry, transient, and obtained only when an effort is made to move the joint and is then spoken of as muscle spasm.

8. Swelling—Due to a thickening of the Synovial membrane, to fluid in the joint, and sometimes to a thickening of the bones. When the swelling is the result of fluid, it is uniform in character, and fluctuation can be obtained. It must be remembered that the size of the joint is accentuated as the result of the muscular wasting that is always present.

9. Muscular Wasting—A constant and early sign of the disease, due partly to disuse, but largely to the direct action of the toxins.

10. Alterations in the Bony Outlines—Following destruction of the bony surfaces of the joint, with resulting shortening and deformities of position.

11. Abscess Formation—Either within or without the joint or superficial, as the result of the Edema and breaking down of the "Tumor Albus" or White Swelling.

Diagnosis.

The diagnosis of Osseous and Joint Tuberculosis is based upon:

(a) Family history—This is of little value in so far as the direct transmission of the disease; the child does not inherit **the disease,** but as the result of the parent's condition, the child is not robust, the most frequent infection being a direct one, as the result of breathing in or swallowing the dried sputum of the parent.

(b) Age—Most frequent between the ages of five to twelve; greatest incident being at the age of ten. (Albee) (1).

(c) Symptoms.

(d) Physical signs.

(e) X-ray examination, which cannot always be relied on.

Lovett and Walbach (3), in a study of twenty-six cases of obscure bone lesions in children, from a diagnostic, clinical and Roentgen ray study, remind us that Tuberculosis in bone may simulate any other infectious process in location and character of lesion, therefore a diagnosis from the Roentgen studies is occasionally impossible.

Roberts (4) says, "My experience leads me to go further than this, and to say, that the symptomatology and radiographic fiindings of Tuberculosis and Syphilis are usually so nearly identical that to make a diagnosis of Tuberculous Joint disease without first eliminating the possible presence of Syphilis invites serious error, which jeopardizes the welfare of the patient."

(f) Tuberculin tests—Valuable aids in the diagnosis, depending upon the heightened susceptibility of the Tuberculous subject to the toxins of the tubercle bacillus, shown by the general reaction of malaise, headache and fever, and locally by a hyperemia at the point of inoculation. There are three (3) tests in common use—Calmette or Opthalmic, cutaneous reaction or Von Perquet, and the focal test.

Duthweiler (5) found in a series of twenty-eight cases, in which the diagnosis was beyond question, that only six (6) responded with a positive reaction to the subcutaneous injection of tuberculin, and the focal reaction proved unreliable, both when positive and when negative. None of the children seemed to have been injured by the skin "Von Perquet" test, done with small doses, and the response to this was constantly positive in the twenty-eight cases.

Mioche (6) states, "that on the basis of experience, gathered during five years in **Marfan's** service, the following

conclusions may be drawn as to the clinical value of the tuberculin skin reactions:

"1. It is the procedure of choice among the various diagnostic methods in which local reaction to tuberculin plays a part.

"2. Its diagnostic value is incontestable.

"3. Starting with zero in the newly born, the number of positive cutaneous reactions increases progressively with the age of the subject.

"4. In children under one year of age a positive reaction is a sure sign of progressing tuberculosis and usually of approaching death. In older children, it is not a reliable index of tuberculosis in evolution, unless supported by clinical evidence and in adults its diagnostic value is practically zero.

"As a method that will permit the examining physician to diagnose Tuberculosis in infants it is incomparably better than all others, for, by means of it, he can recognize the presence of the disease at its very onset, and thus perhaps be able to render some service."

(g) Intra-dermal urine test:

Miche (7) has employed this test in place of and to control the tuberculin test, and report that it parallels the tuberculin test. He says, "that with the urine extract the reaction is more pronounced in the very active cases, and it is weak in the cases with a more favorable prognosis," thus throwing light on the outcome. He evaporates fresh urine, and uses the dessicated urine with 2 c. c. of distilled water, forming a 10 per cent solution, and applies it for the test, by the skin or the intra-dermal technic.

(h) **Complement Fixation Test**—The value of this is still under discussion. Petroff (8) claims that the test in Tuberculosis is more specific than the Wassermann test for Syphilis.

Watkins and Boynton (99) draw the following conclusions after a study of 6,500 tests: "The reaction is specific for Tuberculosis and, when positive, should be interpreted as indicating Tuberculosis of some degree of activity. When the Wassermann and tuberculosis fixation reactions are both positive, they should be interpreted without relation to each other.

The positive fixation reaction can be interpreted, as indicating Tuberculosis, either active at the time or recently active. The focus may or may not be of clinical significance, which fact must be determined by other means.

The negative fixation reaction, indicates either absence of infection, excessive activity of the disease exhausting the anti-body or arrest of the disease with spontaneous disappearance of the anti-body no longer required."

(i) The Wrist Sign:

Asteriades (10) refers to a small synovial cyst in the wrist, usually on the dorsal surface of the Radio-carpal Articulation and causing no disturbance. He says, that "Tixier" was the first to note that persons with a cyst of the kind, almost invariable developed Tuberculosis sooner or later, some joint process or pulmonary lesion.

(j) **The Milk History**—Whether the child has been fed on milk from an untested cow or herd.

Differential Diagnosis.

Osseous Tuberculosis must be differentiated from Syphilis, chronic Staphylococcic Osteo-myelitis, Periosteal and Central Sarcoma, and Sub-periosteal Lipoma.

In **chronic Staphylococcic Osteo-myelitis**, there is a history of an acute onset, with exacerbations and relapses, high temperature, local inflammation, with oedema and tenderness, absence of the tuberculin tests and finally the X-ray examination.

In **Sarcoma**, there is a very rapid growth with severe and persistent pain, no suppuration and the X-ray findings

Sub-periosteal Lipoma causes but lit-

tle pain, there is an absence of any bony changes and the X-ray examinations show healthy bone.

Syphilis—This is a chronic process, with a history of Syphilis in the family, and the individual will generally show other signs of the disease, Wassermann positive, the bone shows enlargement, pain is present, being constantly so at night. X-ray examination being of itself unreliable but must be considered with other clinical symptoms.

In making a diagnosis of Joint Tuberculosis, the following diseases must be considered:

1. Traumatic and Infectious Synovitis and Arthritis.
2. Peri-Articular Bursites.
3. Syphilis.
4. Rheumatoid Arthritis.
5. Still's Disease.
6. Hysterical Joints.

Infectious Synovitis and **Arthritis** is of sudden onset, with a rapid and large effusion in the joint, an early tendency to suppuration, marked constitutional signs, a focus of infection elsewhere, and finally the X-ray appearance.

In **Peri-articular Bursitis**, all of the symptoms are limited to the region of the bursa, there is no wasting or night cries, and the X-ray examination shows the joint to be unaffected.

Syphilitic Joint Disease occurs in infancy. There are other signs of the disease in the child and in other children of the family. Wassermann is positive. The X-ray findings alone are not reliable.

Rheumatoid Arhtritis—This condition is rare in children, there is enlargement of the joint with limitation of motion, definite X-ray appearance, more than one joint is usually involved and evidences of some focal infection.

Still's Disease—Begins in early life, before the second dentition, poly-articular, with generally an arrested development and enlargement of the lymph glands and spleen. The joints do not suppurate or become ankylosed.

Hysterical Joints—Here we have sensitiveness, lameness and pain variable in intensity; the symptoms are not constant, and usually other hysterical manifestations are evident. X-ray examination negative.

Prognosis.

This is good in both Osseous and Joint Tuberculosis, in so far as life is concerned. In Osseous Tuberculosis, a good functional result is left, if the process is limited to the original focus. In Joint Tuberculosis there is always some destruction of the joint structures with crippling of the individual, and even ankylosis. Death occurs only when a secondary infection takes place, undermining the general condition of the patient.

Klare (11) regards the presence of Uro-Chromagen as an important factor in the prognosis, and says, "the continual demonstration of Uro-Chromagen is to be regarded as indicating a very unfavorable prognosis, and while patients presenting a transitory Uro-Chromagen reaction may live for several years, they have no prospects of recovery." He asserts that a persisting positive Uro-Chromagen reaction with a Tuberculous joint process is sufficient indication for amputation.

Treatment.

This is to be considered under the following heads: General, special forms, conservative, operative and that of complications.

In all types of surgical tuberculosis, the same general features of treatment are employed. Absolute rest and fixation of the diseased part, an abundance of easily digestible and wholesome food, fresh air and sunshine, warm clothing, and the protection of the patient from any and all conditions that tend to lower and impair the general body health and power of resistance.

Special Forms of Treatment.

(a) Tuberculin Therapy—Based upon two objectives.

1st. To eliminate the patient's hypersensitiveness to the products of the tubercle bacillus by means of minimized doses of tuberculin, gradually increased, and

2nd. The stimulation of the patient's immunizing machinery to produce the maximum amount of anti-bodies, by the administration of the maximum amount of tuberculin consistent with that individual's hyper-sensitiveness." "Albee" (1). A detailed method of administering tuberculin can be found in an article by Bonine, N. Y. Medical Journal, April 15, 1916.

The real value of this form of treatment is still a subject of dispute, some authorities claiming wonderful results, while others see no benefit from its use. "Kleinberg" (12), in an able review of the subject, with a report of several cases treated with tuberculin, draws the following conclusions:

1st. Tuberculin does not cure Tuberculosis of Bones and Joints.

2nd. In the majority of cases, tuberculin therapy causes no noticeable beneficial influence over the bone or joint lesion.

3rd. In a small per cent of the cases, there is improvement of the lesion.

4th. In some cases, there may be distinct aggravation of the disease.

5th. New abscesses may appear during and after completion of the tuberculin treatment.

6th. Relapses occur after apparent improvement.

"Olgilvy" (13) says, "that tuberculin is of decided value in the treatment of tuberculous joints. It may be administered during any stage of the disease."

Sidney A. Twinch (14), in a summary of his article in the American Jounral of Orthopaedic Surgery, Sept., 1917, concludes, that "Tuberculin checks the local process, the individual also regaining and maintaining strength, not attained by treatment alone on general, hygienic and orthopaedic lines.

The action of tuberculin of rendering inert the local focus is due to a temporary immunizing process, and only repeated courses of the substance will serve to maintain permanent quiescence."

(b). **Helio-therapy**—This therapeutic agent has grown greatly in favor, in the treatment of Surgical Tuberculosis. The advocates of it and those who have practiced this form of treatment, to an extent worthy of an opinion, claim that it reduces pain, acts as a tonic, building up the system, and thereby aiding in the production of a sclerosis, and also acts as a destructive agent to the bacillus.

Dr. Rollier, of Switzerland, is an ardent advocate of heliotherapy, and in the ten years from 1903 to 1913, gives the following results after treating 1,129 cases of external tuberculosis:

Cured, 84.1 per cent.

Relieved, 10 per cent.

Stationary, 3.2 per cent.

Dead, 2.7 per cent.

"Negri" (15), writing in the Policlinic, Rome, Oct. 11, 1920, reports the successful treatment of twenty-five cases, including a number of cases of bone and joint lesions of the arm. These cases were treated in his clinic, and were without the beneficial result of altitude that some were inclined to attribute to Rollier's success. In a second contribution of Nov., 1920, Negri does not hesitate to assert, from his six years experience, that surgical tuberculosis can be cured in all its forms, at any stage, and at all ages, by helio-therapy.

"Freiberg" (16), reporting three cases, treated in the Cincinnati General Hospital, states, "From our experience with these three cases, it seems inevitable that exposure to the sun's rays, as here practiced, resulted in speedy

improvement, which can fairly be attributed to this agency.

2nd. The retrogression which ensued upon having to abandon the systematic use of the sunlight, seems to emphasize this fact and makes it desirable to continue this during the winter in our own environment.

3rd. The results which we have obtained seem to indicate the value of this method, even in the vicinity of large cities and at low altitudes where, according to Rollier, the potency of the ultra-violet ray is greatly diminished by the stratum of moist and unclean air through which they must pass.

Robert W. Lovett (17), of Boston, also advocates the sun treatment of Surgical Tuberculosis, and in an article in the A. M. A. Journal, April 3, 1920, he describes a new method of applying helio-therapy by means of a double convex lens, this form of treatment having been used at the Sanatorium in Morlaix, Brittany. He presents the report of twelve cases treated, and comments as follows: "For six years I have had experience in sun treatment, in which the whole body has been exposed, and I am a strong advocate of its value. I am equally convinced that the treatment with the lens is a distinct addition to our therapeutic measures, as it possesses decided advantages. It can be delicately regulated and controlled; it is applicable when the sun is sufficiently clouded to be useless for general exposure; and it can be used in a sunny room by opening the window and pointing the cylinder at the sun. It seems free from risk when used according to directions and it seems to embody real possibilities.

The value of the treatment would seem to have been demonstrated in cases of Chronic Suppuration from Tuberculosis, Syphilis and Chronic Osteomyelitis."

Sorrel (24) states that, from his experience, combined helio-therapy and seashore environment form the most energetic treatment for Tuberculosis of of the Bones and Joints. With bone disease general treatment is of first importance but local measures must not be forgotten. They vary, however, with the age; in children the minimum of intervention should be the rule; in adults resection. After the age of 50, a cure cannot be counted on, and amputation is generally called for.

Rollier & Rosselet (25) state that their twelve years experience have confirmed their previous statements as to the mechanism of the curative action of helio-therapy; and they have observed that those who tan well recover more rapidly and better, and that the pigmentation possibly transforms the short waves into longer waves. They oppose the importance placed on the ultra-violet rays from the biologic and medical point of view, and from their experiences place the luminous rays in the place of honor, but all the rays in sunlight have some action on our organism.

The writer now has a series of cases, receiving helio-therapy, two of whom have had other therapeutic measures, and from the improvement in these cases, since instituting direct exposure to the sunlight, he is convinced of its value.

X-ray Therapy has many advocates, among them being Iselin, Schede, and Bittrolffs, but it seems that this form of treatment is particularly beneficial in lesions of the bones and joints of the hands and feet—more or less superficial lesions. In children the use of the "rays" must be particularly guarded, especially in the neighborhood of a joint, because of the danger to the Epiphyseal cartilage.

"Espinola" (18) is of the opinion that Roentgen treatment is the best of all measures in surgical Tuberculosis, especially in cities, and where the effect can be supplemented by helio-therapy.

"Stromeyer" (19) states, that, in young subjects, Roentgen ray treatment offers excellent chances of success, and usually gives much better results than surgical treatment. In older patients this form of treatment is not so favorable, but should be tried, unless there are contra-indications. He also advocates the ray in all operated cases unless the danger of recurrence is out of the question.

"Cottenot" (20) deplores the fact that, notwithstanding the fine results realized from irradiation of bone and joint tuberculous processes during the last two years, that this form of treatment has not won the place it deserves in tubercular therapy, because it is efficient and harmless.

Electric Treatment. "Doumer" (21) reports the final results of cases he treated eight years ago by the application of the high frequency current, as being cured, and no recurrences. The treatment was a sitting for ten minutes daily or three times a week, the current 80,000 volts interrupted up to 800,000 or 1,000,000 times a second.

Hyperemic Treatment: This form of therapy was instituted by Bier, as the result of Rokitansky's report, that persons suffering from Mitral Incompetency with Venous Stasis rarely developed Tuberculosis; and in some cases of Tuberculosis of the Bones and Joints has had a beneficial effect. The results of this form of therapy are:

(a) **Edema**, from the periphery to the center of the limb at first, thus carrying an abundance of leucocytes to the diseased focus, as well as the lysins and opsonins, and later on, the reversal of the circulation, removing the dead bacteria and their products.

(b) Absorpton of an organizing exudate.

(c) Relief of pain, muscle spasm, and lessening of the activity of the disease.

(d) A tendency to aid in fibrosis and hypertrophy of bone.

The hyperemia may be induced by the local application of dry heat, by constricting the limb above the focus of disease in order to retard the Venous Circulation, by dry cupping or suction.

From the reports of this form of therapy, we find that it must be associated with absolute immobilization of the parts, that it gives better results in the young than in the adult and that the results are better in cases of Tuberculosis of the hands and wrists than in the lower extremities.

Conservative non-operative treatment depends upon the absolute rest and fixation of the diseased part and in the care of a joint process the joints immediately above and below the one involved must be included in the fixation and immobilization. The fixation and rest of the part can be obtained by the use of, metal or wooden splints or by a plaster of paris dressing. The latter is probably preferred by the majority of Orthopaedists being of little cost, easy to apply and it can be made to conform to the outline of the part to be treated, thus providing absolute fixation. Its weight, and the muscular wasting that follows its use, are the main objections. In a joint process, fixation can also be obtained by traction with weight and pulley and counter traction by raising the head of the bed. In using this method of obtaining fixation, the patient must be kept at absolute rest, either by the use of a Bradford frame, with associated bent pipe frames, or else by some definite method of securing the entire body to prevent motion; this, of course, being particularly applicable to Joint Tuberculosis. If the traction method is employed the pull must be in the line of deformity, the deformity itself being disregarded, until a later period, when it can be corrected by suitable operative measures.

In Osseous Tuberculosis, the conservative treatment is the first measure, but operative intervention must be always

in mind and instituted before bone destruction takes place, or secondary infection with abscess and sinus formation occurs, or where amyloid disease threatens. Some authorities are opposed to conservative treatment of joint tuberculosis, when the disease is early diagnosed, and advise immediate operative measures, with removal of the tuberculous tissue. Personally it seems sound and rational that, if we can make an early diagnosis, the complete removal of the diseased structures would be the treatment par excellence.

Operative Treatment: In Osseous Tuberculosis, consists in incising over the diseased area, the periosteum is then incised and raised. The bone opened by trephine or chisel, removal of all diseased bone and the resulting cavity carefully curetted and finally treated by appropriate measures; such as iodoform gauze pack, Beck's paste, Neuber's iodoform starch, inlay bone graft, etc. The incision should be so placed as to go between the muscle planes, and thus avoid injury to the muscles, nerves and vessels. If the disease involves the bone through its entire diameter for a limited portion, a resection, followed by a bone graft, should be considered. After any operative procedure, the limb should be put in a carefully moulded plaster dressing, including the joint above and below the operated bone, this dressing to remain from five to six weeks, when it is removed and a second plaster applied, which is to remain until X-ray examination shows a definite healing, or in the event that a bone graft has been used, a hypertrophy of the graft is shown.

In Joint Tuberculosis, the chief object of operative treatment is the removal of the diseased tissue, and each case must be carefully studied and suitable operative procedure instituted—these measures being arthrotomy, curetting, synovectomy, arthrodesis, arthrectomy and excision and finally amputation.

The deformities arising from conservative treatment of Joint Tuberculosis may be corrected either by conservative measures gradually or immediate induced, or else by suitable operative measures; such as osteotomy, tenotomy, myotomy or fasci-otomy.

Treatment of Complications.

Ichor Pockets (Abscess): It is to be remembered, that an Ichor pocket is sterile and therefore special care should be taken in its treatment to prevent a secondary infection. Conservatism should be the rule, unless some special indication for operative interference arises. Frequently, even when pointing beneath the skin, an Ichor pocket, under appropriate treatment, will be absorbed. Operative interference is indicated when there is danger of pressure necrosis with sinus formation, mechanical interference with function, great discomfort and pain from tension, or evidences of secondary infection. The operative measures are aspiration and incision.

In aspirating an Ichor pocket, a thick portion of the abscess wall should be selected, through which the needle is inserted obliquely, so that, upon its removal, the danger of a sinus will be lessened. A collodion dressing is then applied, followed by gauze and bandage, and finally the part is placed in the position best suited to favor the return of the Ichor to its original focus. Some operators follow the aspiration by the injection of iodin, 10 per cent zinc chloride, a solution of iodoform in ether, thymol camphor, etc.

The **Incision** of an Ichor pocket demands the most rigid asepsis; it should be long enough to enable the operator to express all materials and clots, no instruments should be introduced into the cavity, and injury to the granulation of the abscess wall should be avoided. The incision is to be carefully

sutured in layers, **without drainage**, and a firm, even compress applied. Absolute recumbrancy is then enforced, from two to three weeks, in order to avoid any chance of breaking down the line of sutures.

Sinuses: The ideal treatment is, of course, excision, but unfortunately on account of their length and tortuosity, this is frequently impossible, so other measures have to be instituted. In as much as a sinus is the direct result of the breaking down or opening of an Ichor pocket, a secondary infection is generally present, and for that reason, an autogenous vaccine is frequently of benefit, associated with tuberculin therapy and helio-therapy.

"Beck" (22), of Chicago, noticed that in injecting sinuses with bismuth for Roentgenographic work, many of them subsequently healed, and therefore advocated the use of bismuth injections in the treatment of sinuses. He used a mixture of bismuth sub-nitrate, one part; vaseline, two parts, heated on a water bath and injected at a temperature of 40 degrees Centigrade, using about 10 c. c. of the mixture.

"Ridlon and Blanchard" (23) called attention to the following contra-indications to the use of Beck's paste:

1. The presence of a Sequestrum.
2. Coincident Amyloid Disease.
3. The presence of a large pus sack at the terminus of the sinus.
4. Sinuses of tuberculous bone disease which are less than two or three months old.
5. Extensive ulceration of the skin with undermining of large areas of it.

The dangers in the use of Beck's paste are bismuth poisoning, acute toxemia from a damming back of pus, and infection of a neighboring joint.

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DIARRHEA IN INFANCY

By W. P. Cornell, M. D., Columbia, S. C.

According to Mortality Statistics for 1918 (pg. 42), the death rate from Diarrhea and Enteritis under two years of age, averaged for the eight years 1911 to 1918, inclusive, 63.9 per hundred thousand population throughout the registration states.

This is a higher death rate than occurred during the same period, including all ages, from all of the following diseases combined: Typhoid Fever (15), Malaria (2.4), Smallpox (9.2), Measles (9.8), Scarlet Fever (5.2), Whooping Cough (10.9), Diphtheria and Croup (16.2), and Poliomyelitis (2.5), which total 62.2 per hundred thousand population.

In 1918 Diarrhea killed 2,880 times as many babies as Hookworm did people of all ages; 320 times as many babies as Small Pox did people of all ages; 902 times as many babies as Rabies did people of all ages; and 14 times as many babies as Pellagra did people of all ages.

These diseases have been subject to systematic study, health regulations, money appropriations and organized combat. Why not Diarrhea?

South Carolina averaged in 1916 71.9; in 1917, 79.4; in 1918, 75.1 per 100,000 population.

That marked improvement can be brought about witness the following:

Maine dropped from 60.3 in 1916 to 39.1 in 1918.

Indiana dropped from 62.6 in 1916 to 47.1 in 1918.

The profession and laity appreciate the value of state health laws in the fights against Measles, Scarlet Fever, Diphtheria, Whooping Cough and Poliomyelitis, but these combined only kill 44.6 per hundred thousand population

(Read Bebore the Newberry County Medical Society, July 8, 1921, Newberry, S. C.)

for all ages, as against 63.9 for Diarrhea under two years.

To illustrate the possible benefits to be derived from preventive measures let us go briefly into the etiology.

The predisposing conditions appear to be much more important factors than the exciting causes, and at the head of the list, almost to the exclusion of others, stands artificial feeding.

Holt says (1919, pg. 352), "Less than 5 per cent of the serious cases of diarrhea are amongst the breast fed, and fatal cases amongst the exclusively breast fed are really rare, no matter how bad the surroundings or how ignorant the mothers." Think of what this statement means!

If over 95 per cent of these cases occur in the artificially fed, what an enormous reduction in incidence and mortality would result if we would, from today, discourage premature weaning and help mothers to prolong their nursing period. Dr. Jacobi, and other eminent authorities since, have said that nearly 100 per cent of mothers can successfully nurse their babies.

Of a total of 47,753 deaths under two years in the whole registration area, 36,807 or 77 per cent occur during the first year, or nursing period, and would be directly affected if the mothers would co-operate.

Only 3,537 of these deaths during the first year occurred amongst the colored races. The white mothers stand for over 90 per cent of the loss.

It can be seen, therefore, that our foremost duty is to fight against the ever increasing prevalence of premature weaning.

This disease occurs almost entirely during the hot summer months.

If only 5 per cent of nursing babies are affected by hot weather against 95 per cent artificially fed, what is the relationship between the two great causes, artificial feeding and summer heat?

City residence does not seem to cut much figure, for the statistics show that only 56 per cent of the deaths occur in the cities as against 44 per cent in the rural communities. The fact that the same hot weather acts on both breast-fed and artificially fed, and affects 95 per cent of the latter as against 5 per cent of the former, would suggest that the constitutional effect of artificial feeding was the main predisposing condition upon which heat, the chief exciting cause, acts.

Why can breast-fed babies stand up under the ill effects of heat, when the artificially-fed cannot?

Evidently their stamina, or power of resistance, is greater. Why? What constitutes resistance, and in what tissues or structures does it reside?

Physiology teaches us that the protein, or nitrogenous food principle, is the only one that adds red meat to our bodies and gives it resistance and strength; that the fats and carbo-hydrates produce heat and energy.

In hunting an answer to this, let us compare the diet of the majority of artificially-fed babies with that of the breast-fed.

By far the most popular baby food I meet with is sweetened condensed milk. It is comparatively cheap; is easily prepared; fairly clean, and obtainable everywhere; and it apparently agrees, that is, it doesn't immediately disagree, with most babies.

Mothers' milk has about 7 per cent milk sugar, and in giving condensed milk (or any other of the so-called baby foods which are all, in main, highly concentrated sugar preparations) we dilute them with water until their sugar per cent is brought down to within safe limits, about 6 per cent to 7 per cent. This results in diluting the original fat and protein per cent, which was relatively low in the beginning, to way below the baby's needs, and we bring about a fat and protein starvation. It

now has to feed upon its own fat and protein with resultant loss of vitality. It at first appears to do well, and puts on weight, due to the sugars binding the waters to his tissues, but gradually a water-logged state ensues, in which cross section will show very poor musculature with increase of fat everywhere, and he becomes weak and flabby and eventually pale. Resistance is impaired, due to protein starvation, and they cannot stand any illness well and are "knocked" out by hot weather, and literally wilt away from drainage of the water from their tissues.

This, to my mind, pictures the reasons for the prevalence of summer diarrhea. One might almost consider it as a late sequel of malnutrition of protein starvation origin, brought on by hot weather.

Its prevention calls for maintenance of the baby's resistance during the winter and spring months through, first, maternal nursing, and secondly, if weaning must be done, the immediate placing of it upon a balanced diet, or one in which each of the food principles, fat, sugar and protein, is represented, plus fat and water soluble vitamins.

The same principle obtains in babies of the second year. Here the mothers, after stopping the breast milk, feed the baby on potatoes, cream of wheat, bread, crackers, hominy, corn meal or other starchy food, and leave out of the dietary fats and protein. They do not know what protein is; what foods supply it; nor of the absolute necessity of its presence in the dietary.

I venture the statement that to most of the laity, and to a few physicians, the word food means simply something to eat, and that the necessity of a knowledge of the differences between fats, sugars and proteins has never entered their minds.

It is distinctly the doctor's place to teach mothers these facts, as there is no one else to do it.

The only foods, aside from mothers milk, which supply sufficient fat and protein, are cows milk and meat. Therefore, until a baby is old enough to eat meat it must have cows milk. At least one and one-half ounces, per pound body weight, per day. In the second year this may be reduced and supplemented to advantage by fresh vegetables which supply protein, and iron, which is practically absent from cows milk.

Is there any way in which we can prevent or lessen the ill effects of the summer heat on these babies with lowered resistance?

What, if any, differences occur in a baby's environment during the winter and summer?

The housing conditions, as to ventilation and foul air from over-crowding, should be better in summer, as windows and doors are left open.

One thing that stands out prominently, as offering a possible means of relief, is the baby's clothing. Many, if not most, babies throughout their first year are enclosed in practically the same amount of clothing in summer as in winter, including the belly-band and often the wollen shirt.

Clothing is worn to keep in the body heat and prevent its loss by evaporaiton, and not to keep out cold air.

In summer these too warmly clad babies perspire into the inner garments and we have added great humidity to the retained body heat.

May not this artificially retained humid heat be the source of the severe reaction upon these babies of low resistance?

We are all familiar with the physical depression and lassitude felt during the summer in humid atmospheres, and know that these feelings are not experienced in dry, though as hot, localities.

The mortality for diarrhea under two years in Kansas is only 28.5 and

in Missouri only 35.6 per 100,000 population as against our 70 to 80.

Other predisposing conditions exist, but I do not think them of sufficient importance, compared to the above, to take up the limited time for their discussion.

Is the disease markedly contageous or infectious?

At first thought it would appear so, from the rapid progression through a locality, once the hot season with its effects on milk and food sets in.

Also, the swarming of flies that occurs at this time would lend to this view, and that contamination from the stools was a direct, and most important, means of spread. Possibly so, but why, if the organisms in the stools are the direct exciting cause of the disease, are so many of the creeping, breast-fed babies immune, and why do the two and three-year-old babies, who are in such intimate contact with cases, escape?

If a large majority of these cases were suffering from a bacterial invasion and toxaemia, would they clear up, as the majority of them do, in 12 to 24 hours upon the withdrawal of food and free giving of water?

You are all familiar with the return to bright consciousness, appetite and strength, which usually occurs, and is permanent, if purgative, opiate and starvation is not persisted in.

I do not belittle the influence of Shiga's, Flexner's, or other bacteria, but I do believe in the theory of Finklestein and others that these cases are primarily ones of dyspepsia and food intoxication, and that these prepare the field for the implanting and growth of the bacteria, which takes place several days later through mismanagement by purgatives, opiates, and starvation or improper feeding.

Once the bacterial invasion has occurred, then the spread by contagion can take place by the same means as occurs in typhoid fever, or the three Fs, feces, fingers and flies.

Here preventive treatment calls for the use of measures such as stool disinfection, food protection and preparation, through personal cleanliness of patient and attendant, and fly destruction and screening.

In the treatment of the disease the continued high mortality rate calls for a radical change from the methods of purge and opiate frequently repeated while mucus shows in the stools, and continued starvation, which have been handed down to us for the past hundred years and more.

The laity has been educated to this old method and generally gives it a thorough trial before sending for us, until the baby is desperately ill and our efforts handicapped.

We must teach the new conception of the disease; that it is a constitutional disease in which every tissue is malnourished, and that the diarrhea is a local, life saving symptom, by which nature is ridding the system of poisonous matter which, if retained, will kill the baby.

They must be taught that to give castor oil or other purgative is not needed if the bowel is already emptying itself, and that they act, and increase peristalsis, only through irritating the already irritated bowel, and themselves produce the mucus which so terrifies the mothers.

It must be explained to them that to check the discharge of the poisonous bowel contents will result in its absorption, with resultant toxaemia and its fever, unconsciousness and death. Paregoric and bismuth are harmful.

Equally important to explain is that the fever and mental depression are the only safe guides as to the state of toxaemia, and that as soon as these clear up the nourishment must be started, for, just as in Typhoid Fever, unless the strength is kept up by food, and there

is no drug or anything else that will do this, the baby will rapidly consume his own tissues and die of starvation.

In other words, there is no drug treatment for diarrhea.

We of the profession are responsible for the laity's confidence in the nutritive value of barley water, albumin water, and panapeptone. We now know that these have too little food value to be even considered as foods when prepared in the routine ways, and unless we warn mothers they will continue their use and kill their babies.

Treatment:

This should vary according to the underlying causes of the diarrhea, and we meet with these four main etiological types:

1. Par-enteral infection. Here we have some disease outside of the intestinal tract to which the baby reacts with diarrhea. Otitis, Rhinitis, acute Adenoiditis, Dentition, Thrush and Stomatitis, Tonsilitis, Pharyngitis, Bronchitis, Dermatitis and Prickley Heat, any infectious disease as Measles or Varicella, or Pyelitis, etc. In such par-enteral infections weaken the diet somewhat without disturbing its balance and treat the par-enteral infection. Don't purge the already irritated bowel, it can't help the par-enteral infection.

2. Enteric Infection. Here we have a true Dysentery due to Shiga's, or Flexner's, or the gas bacillus. These are due to infected milk and come on suddenly in a previously well child, with fever and bloody, alkaline stools.

Carefully differentiate from a par-enteral infection and from an acute intussusception, and then feed upon a pure carbo-hydrate diet to bring about an acid fermentative change in the intestine.

It has been shown by Talbot that both Shiga's and Flexner's germs are facultative and can feed upon either protein or carbo-hydrate, but that upon protein they thrive best and their toxins are virulent, whereas, upon carbo-hydrate their growth is inhibited and their toxins are rendered non-virulent.

Suitable carbo-hydrates are: Horlick's Malted Milk (I usually prefer this because most babies like it best), Mellin's Food, Dextri Maltose, Milk Sugar, and even sweetened condensed milk.

What we want is a sugar food that the baby will take willingly, and any of these, if diluted so that its sugar per cent is made about seven, will be practically free from fat or protein.

Theoretically one would think that a seven per cent lactose solution inoculated with bulgara bacillus would be ideal, but there is no telling how much of the sugar would be converted into lactic acid and whether enough would be left to nourish the baby. We might cure the disease but kill the baby from starvation.

Again purgatives will irritate the bowel, and produce mucus which is composed mostly of protein and so nourish the germs and do this additional harm. Leave off the purgative entirely.

3. Mechanical Diarrhea. This is most frequently seen in older infants, during the latter part of the second year. These babies are getting about and picking up things in the yard or from the floor, also, they are fed from the table coarse foodstuffs which they swallow without chewing. They are given uncooked hominy and seedy fruits which they swallow without chewing. They get at something especially nice and proceed to overeat thereof. They get to the ice cooler and drink rapidly long drinks of ice water which congests the lining of their stomach (put your hand in ice water for one minute and upon removal watch it turn red).

Here, at times, I can see indications for a dose of oil or other mild purgative, but even here if diarrhea has started, showing that the offending food has been eaten some time so that it has

probably progressed into the lower bowel, I believe a large enema, with lots of water by mouth, will accomplish the desired results safely and without increasing the intestinal irritation manifested by the presence of the diarrhea.

4. Fermentative Diarrhea. This is the great class referred to above in which prevention of protein starvation through maternal nursing, or the giving of a diet balanced with protein, would do so much towards lessening diarrhea, and infant mortality in general, through maintenance of the baby's strength and resistance.

Carefully eliminate par-enteral infection by thorough examination of ears, throat, urine and whole body for point of infection, and Mechanical Diarrhea through accurate history.

In Fermentative Diarrhea the history will reveal faulty previous feeding, usually a one-sided diet with excess of sugars and too little fat and protein. Maybe, but far less frequently, an excess of fats through the use of rich unadulterated cows milk, or the use of top mixtures of cream. Some mothers think that cream will overcome constipation, that it, instead of sugar, is nature's laxative.

You will get a history of slight and maybe transient digestive upsets; the weight gain has been irregular and maybe stationary for a month or more; periods of impaired appetite with some fretfulness and crossness; the child seems spoiled. His color has not been quite so good as formerly, and he doesn't sleep as soundly. When he is picked up he doesn't jump and resist as he used to, he is more or less flabby. These are all evidences that he has been undernourished and should tell you that his trouble is constitutional (in his tissues, organs and muscles) and not limited to his intestinal tract.

A spell of hot weather comes along and he doesn't stand it as well as the breast-fed babies next door; his weak point, his digestive system, gives way and he shows several loose stools and maybe vomits. The stools will be found to be acid and they will excoriate the buttocks very soon.

This baby, through deprivation of proteins in his diet, has been metabolizing his body proteins, and cross section of his thigh would show stringy muscles surrounded with a loose watery fat. His resistance is lowered. His tissues are surcharged with sugars and his intestine filled with carbo-hydrate (either sugar or starch), and through his upset, his absorptive powers are lowered and have allowed the bacteria from the colon to ascend into the ilium where they are swarming and attacking the carbo-hydrates, and fermentation with formation of acid is progressing rapidly.

This excessive acidity prevents the digestive ferments of the pancreas, liver and intestinal glands, which act in an alkaline medium, from performing their functions, so that the giving of more food is prohibited in that it cannot digest, and only keeps up the fermentation.

The breaking down of the foodstuffs that are already there, by fermenting, produce poisonous by-products which are carried through the intestinal wall into the lymph and blood circulations, and we have the picture of intoxication so frequently observed, and so to be dreaded.

The very presence of the green liquid stools shows that the intestines are irritated and very probably congested. The more frequent the stools the more is the intestine irritated, though as yet there may not be much mucus, which is the sure sign of congestion and inflammation.

Surely the indication is to rest the bowel and let the fermenting foodstuffs be passed off by nature's effort through the diarrhea.

This it will do in twelve to eighteen

hours if we stop putting more food into the stomach, and we can help nature greatly by the giving of plenty of water by mouth. This will not irritate, but will reduce the acidity through dilution and so sooth the bowel, and the addition of a weak soda solution will help still more.

Purgatives cannot correct or help this condition. They cannot check the acidity, nor do they supply fluids. They work by irritating the bowel and this causes the pouring out of mucus and blood.

The congestion favors the implantation and growth of the dysentery organisms, and the mucus, being protein in makeup, feeds these germs and makes their toxins virulent. Dysentery occuring in these fermentative diarrheas I believe is usually secondary and caused by the congestion from the use of the purgatives.

Water cleans out just as thoroughly as purgatives and is without local irritating effect. It overcomes the acidity by diluting the intestinal contents, and it tends to check the severe drainage of fluids and salts from the tissues. The bacteria will go back into their normal place, the colon, as soon as the food stuffs have passed down from the ilium. This takes place usually in twelve to eighteen hours, as shown by the lowered temperature and improvement of the infant, and it is now imperative that food be given to maintain life.

The chief danger of diarrhea is the acute drainage of proteins and salts and fluids from the body, and food is the only thing that can replace these and save the child.

Because we have a fermentative condition to deal with we must not give carbo-hydrates. The only other foods are the fats and proteins, and as the fats tend towards fermentation they must be reduced somewhat, and we are therefore left with proteins as our sole food.

Sugars ferment readily in the presence of whey salts, so that skim cows milk undiluted is unsuitable, and to dilute the skim milk would lower its food value to the point where it is unsustaining.

Bulgara Milk has 5-10 to 1 per cent fat; 3 per cent sugar, and 2.5 per cent protein. It is not as serviceable in fermentative diarrhea as is protein (or albumin) milk of which it forms a part and adds the beneficial bacteriacidal effect of its lactic acid.

Protein milk consists of a pint of Bulgara milk, a pint of water and the curd from a quart of whole milk. Its formula is: F. 2.5 per cent; S. 1.5 per cent; P. 3 per cent; S. 5. The whey salts and the sugar are low, and the protein high.

It has been found that a fairly high fat can be used if the whey salts and sugars are low, and this fat adds to its food value.

A very important point to remember though, is that the baby's tissues cannot stand absence of carbo-hydrates for more than several days, and at this time the non-fermentable dextri-maltose, or Mellin's Food, must be added in at least 3 per cent strength. Otherwise a condition of relatives acidosis may come on, due to the body over metabolizing its fats.

Another peculiar advantage in protein milk is the fact that in the presence of its low whey salts a high per cent of carbo-hydrate, up to 8 per cent to 10 per cent, may be gradually added if necessary.

Lastly, remember that the tolerance for all foods is lowered in this type of nutritional disturbance, and the food must me started in small quantities and increased very cautiously, and that the best and most positive guide is the daily weight curve.

In diarrheas associated with severe and continuous nausea and vomiting, the baby is certainly critically ill and

demands prompt and heroic treatment. First think of possible intussusception and ask carefully regarding the passage of blood by bowel. In its presence do not hesitate to anaesthetize and examine rectally and bimanually for tumor mass, and even then it may be missed and yet the case be one of intussusception, especially if the onset was sudden and abrupt in a previously well baby. It is frequently overlooked.

To control non-obstructive vomiting the first essential is gastric rest after cleansing by gavage. Soda solution, dram 1 to the pint, is anti-acid and soothing, and one or two ounces may be left in. Then try, after an hour or two rest, small amount of water or soda solution at fifteen minute intervals, and don't distend the stomach with fluids for twelve to eighteen hours. In the mean time the baby must have fluid carbo-hydrate in its tissue to prevent acidosis.

The ideal, and life saving proceedure here, is to inject into the peritoneal cavity five to seven per cent dextrose solution, in amount enough to comfortably tighten the abdomen, at about 105 degrees.

This may be repeated at twelve-hour intervals until the baby's stomach will retain.

Sometimes a reverse peristalsis is occurring, as shown by bilious vomiting, here minute doses, 1-30 to 1-20 grain of calomel, at half-hour intervals seems to help.

MALARIA AND ITS CAUSE, AS REGARDED IN FORMER YEARS, AS CONTRASTED WITH THE VIEWS IN THIS PROGRESSIVE AGE OF THE PROFESSION.

(By D. M. Crosson, M. D., Leesville, S. C.)

Gentlemen of the Association:

At the request of our very worthy secretary, that I prepare a short paper and read it at this meeting, I am here, and, taking the season int oconsideration, I know of no more appropriate subject, and I will present to you a few thoughts on the subject of malaria, or rather, I shall make somewhat of a contrast of the ideas of the profession as to malaria in former years and that of the last season and the modern views of the progressive medical profession of today, has of malaria.

Malaria, since the adoption of the modern theory as to its origin or cause, always seemed to me as a misnomer, but it has been so known and discussed since the early days of its observation and recognition, that we will recognize and discuss it as such.

Malaria is an Italian colloquial word (from mala—bad—and aria—air) introduced into English medical literature by MacCulloch in 1827 as a substitute for the more restricted term Marsh Miasm, or paludal poison. In other words, in primitive professional days it was regarded as, and by professional consent it was understood to mean an actual poisonous substance, existing as a separate entity poisonous in all its relations to the human system and economy, and giving rise to the most unhealthy conditions to all systems, that should be so unfortunate as to contract it, and formerly as known by a variety of names, such as ague, intermittent and remittent fever, marsh fever, hill fever, low country fever, fever and ague, and some thought by a figure of speech that the term malaria was applied to the disease itself and the effects on the human body are malarial fever and manifestations of a poisonous malarial process.

The existence of a specific poison was recognized as a pure and certain hypothesis, and to find the cause of intermittent, remittent and fevers of all

(Read before the Second District Medical Association, St. Matthews, S. C., July 20, 1921.)

other names so considered from the same or similar origin and thought by some to be caused by the sudden and excessive abstraction of heat through damp and cold (after sunset) from the bodies of individuals, who had previously endured great solar heat. This view, the unknown etiological accuracy, is sufficiently denoted by the word malaria. It was also thought to be of soil origin, or humidity, or pollution, wind and climatic influences, etc.

The symptoms, as well as the history of this disease, are complex and numerous. This disease was found to prevail in temperate, sub-tropical and tropical regions. It came upon patients in good health, or after days of malaise, or ague-fit, or chill; would suddenly come on, being ushered in more frequently by coldness of the extremeties and back, which extends over the whole body, pinched features, tremor, chattering of lower jaw and teeth, pallor and livid face, dark rings under eyes, shrunken skin, spasmodic construction of the small surface arteries, with small hard and quick pulse, congested kidneys, with hematuria, engorged spleen, torpid liver, etc., with varying cold stages, followed by dry skin and rise of temperature, which varies in intensity of degrees, even running to 105 degrees or more and dropping down gradually or suddenly and varying as to the length of time the chill may come on, or what day it may return. Hence, we have the varied types, those coming on, or returning in 24 hours, have been known, as the quotidian ague, those of 48 hours the tertian type, and 72 hours as the quartan ague.

The varied symptoms you men of the profession are all familiar with, together with the different nomenclature of these varied types, as described as intermittent, remittent, etc., but while it was recognized in the early history of this disease which presented so many varied symptoms and yet recognized, or thought to be, of the same cause; it being the concensus of opinion by the profession at that day that it was produced from bad air, or swamp miasm, and found and prevailed in most all countries and found mostly along the coasts and jungles, which probably gave rise to the idea that it was a miasmatic, or bad air trouble, or origin, and that it was unhealthy to live along the coastal regions or along or near the marshes of bottom lands, or near the water courses where our best and productive lands lay.

This is historical enough, though fallacial, to furnish sufficient data to write books. Though, thanks be to the scientific development and knowledge of medicine and the history and better understandings, as to the cause of diseases, we know better now. I don't think there is any disease described in the annals of the science of medicine, and in pathological and etiological researches of diseases and their cause, which has been so prevalent and so much treated and until recently we know so little about, as the disease malaria.

We knew and recognized malaria (so-called) as we understood that we had these varied forms of fever to contend with and treat, but were very much misled as to its etiology—more so, in my estimation, than in the origin or cause of any other disease, except it be tuberculosis or pellagra, but I am glad to note that former fallacies as to malaria have been exploded, and the vast amount of literature of former years may as well be cast in the furnace of forgetfulness of the past, to cover up our ignorance and unscientific knowledge.

However, in this morning light of the science of medicine, the grandest science in the annals of science, we have new stars and one of them has led us, as a profession, to where we can recognize our professional error, as to the

etiology of this most prevalent disease and that we now recognize it to be of a different cause or origin, and is disseminated by certain kind of mosquitoes, which inhabit the marshes of lowlands and breed in anything and anywhere you find stagnant water, and by their bites we are inoculated with these poisonous germs, producing their various effects and from which the human family has suffered a chachexia, hard for us to eradicate, but we have at last found the cause, and by further scientific professional development and research, we can be sure as to our diagnosis, and knowing the fallacy of our original ideas as to its origin, we now know this origin and we can apply the remedy, and we must say, that while our forefathers in the profession did not understand the etiology of this disease, it is due to them the honor of finding medicinal agents, from our materia medica, to cure the disease. This is quinine and arsenic, with the aid of proper bowel eliminants.

Now, gentlemen, for the sake of argument, knowing the habitations of the mosquitoes, their unsanitary surroundings and environments, being bred and hatched in the very atmosphere in which our foreparents in the profession recognized as unhealthy and unsanitary localities, where these fevers abounded, there being a similarity and an association, as to the cause and effect. The infection, as they thought, coming from these district and places where it is now found that the mosquitoes mostly inhabit or are found. Do you think this poisonous germ is inherent, or inbred, in the mosquito, per se, or is she infected from her habitations and environments in the unhealthy districts? Accepting the modern theory and excluding the ideas of the profession of the past, all former literature, writings and books on this subject are fallacies, and as well may be burned. Adopting the new theory, we have but to screen away from a certain kind of infected and poisonous mosquito and we will have no fever of this type from this or any source.

SOCIETY REPORTS

PROGRAM OF THE ANNUAL MEETING OF THE THIRD DISTRICT MEDICAL SOCIETY, BOISE TERE COUNTRY CLUB, Laurens-Clinton, S. C., SEPTEMBER 29, 1921.

Luncheon, 1 p. m.

Scientific Session:

"Present Types of Doctors," Dr. Rolfe E. Hughes, Laurens, S. C.

"Report of Unique Cases," Dr. Geo. P. Neel, Greenwood, S. C.

"Some Observations on the Trend of American Medicine as Observed at the Boston Meeting of the A. M. A.," Dr. E. A. Hines, Sec. S. C. M. A.

Subject unannounced, Dr. G. A. Neuffer, Abbeville, S. C.

"Unusual Cases," (surgical), D. S. C. Hayes, Clinton, S. C.

"Remarks," Dr. T. L. W. Bailey, Councillor Third District, Clinton, S. C.

"The Feeble Minded Child," Dr. B. O. Whitten, Clinton, S. C.

Volunteer Papers.

Reports of Cases.

Officers Session 1921.

President: Dr. Rolfe E. Hughes, Laurens, S. C.

Vice Presidents: Dr. W. G. Blackwell, Parksville, S. C.; Dr. C. H. Blake, Greenwood, S. C.

Secretary: Dr. C. C. Gambrell, Abbeville, S. C.

Councillor for the District: Dr. T. L. W. Bailey, Clinton, S. C.

LEXINGTON COUNTY

Date of meeting October 3rd; President J. J. Wingard in chair. Roll call, number present 10, number on roll 15. Minutes read and approved.

Dr. Wingard read a paper on Diphtheria. This paper was very full, dealing with the subject from every angle, and was freely discussed by every one present.

Dr. Ballenger of Batesburg read a paper on "The Relation of Infections of Eye, Ear, Nose and Throat to Other Infections of the Body," and told how other organs of the body were infected from these.

The following case reports were given: An old white man whose left eye and portion of nose and cheek had been removed as a cause of disease with good results. Also a negro boy who had a gunshot wound of arm, fracturing bone, and had fairly good use of arm.

A case was reported of a child having two tongues. This case will be shown at next meeting.

The following officers were elected:

President: Dr. J. P. Drafts, Leesville.

Vice-Pres.: Dr. K. L. Able, Batesburg.

Sec.-Treas.: Dr. J. H. Mathias, Lexington.

J. H. Mathias, Secretary.

PROGRAM OF THE FIFTEENTH ANNUAL MEETING OF THE FOURTH DISTRICT MEDICAL ASSOCIATION, EASLEY, S. C., SEPTEMBER 16, 1921, MASONIC HALL, 10 A. M.

Officers.

Dr. W. A. Woodruff.....President
Dr. A. E. Brown.....Vice-President
Dr. W. B. Lyles.....Sec. and Treas.

Program

Masonic Hall, 10 o'clock a. m., September 16, 1921.

Invocation—Rev. James Renfro, Easley.

Address of Welcome, Behalf City of Easley—George W. Allen, Mayor.

Address of Welcome, Behalf Pickens County Medical Society—Dr. L. G. Clayton, Central.

Response—Dr. C. B. Earle, Greenville.

Remarks—President South Carolina Medical Association, Dr. H. L. Shaw, Sumter, S. C.

1. Furunculosis—Dr. J. C. Pepper, Essayist Pickens County Medical Society.

2. Briefs Covering a Period of Forty Years of a Country Doctor—Dr. H. B. Stewart, Fountain Inn.

3. A Plea for a More Careful Consideration of the Therapeutical Effect of Remedies—Dr. L. O. Mauldin, Essayist, Greenville County Medical Association.

4. Focal Infections—From the Medical Standpoint—Dr. W. A. Strickland, Westminster, Essayist Oconee County Medical Society.

5. Some Observations on the Trend of American Medicine as Observed at the Boston Meeting of the A. M. A.—Dr. E. A. Hines, Sec. Editor South Carolina Medical Association.

6. Enucleation of the Tonsil by Blunt Dissection and Snare—Dr. F. S. Westmoreland, Essayist Spartanburg County Medical Society.

7. Post-Operative Treatment Following Goiter Operations—Dr. T. B. Reaves, Greenville, S. C.

8. Symptoms and Treatment of Eye Strain—Dr. William B. McWhorter, Anderson, S. C.

9. The Diagnosis and Treatment of Ureteral Calculous with Lantern Slides—Dr. T. M. Davis, Greenville, S. C.

10. "Don't Convict Your Patient on Circumstantial Evidence"—Dr. D. L. Smith, Spartanburg, S. C.

11. Report of Cases — Gunshot Wounds of Abdomen—Dr. S. Clarence Dean, Anderson, S. C.

12. "An Unusual Case,"—Dr. S. G. Glover, Greenville, S. C.

13. "The Schick Test for Diphtheria, with Demonstration of Same"—Dr. Cheme, County Health Officer for Greenville County.

Luncheon at Mountain Viek Hotel 2 o'clock p. m.

Committee on Arrangements: Dr. W. B. Furman, Dr. C. M. Tripp, Dr. J. L. Bolt.

THE 1920 RECORD

Amount collected from our members
$223,225.00
in 1920
Paid for sickness and accident claims
$145,038.00
in 1920
Saved for future protection of members
$47,825.00
in 1920
Total returned to members and saved for future protection
$192,863.00
in 1920
Expense of operation less than
$2.30
per member in 1920

This kind of real insurance cost our members $13.00 for an accident policy paying $25.00 weekly and $5,000 00 death benefit, or $26.00 for two such policies, while the health policy, covering any illness beginning thirty days after date of policy, except venereal, epilepsy or insanity, has never exceeded $17.00 per year.

$3.00 membershipfee will now carry either policy until Mar. 10, 1922.

PHYSICIANS CASUALTY ASSOCIATION
PHYSICIANS HEALTH ASSOCIATION
304-12 City National Bldg., Omaha, Neb.

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J. P. Drafts, Leesville,
R. H. Timmerman, Batesburg.